

# Navy Personnel Research and Development Center

San Diego, California 92152-7250

AP-97-1 December 1996



## **BIBLIOGRAPHY OF REPORTS and Journal Articles Approved for Public Release: FY96**

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**Bibliography of Reports  
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13. ABSTRACT (Maximum 200 words) This report lists all technical reports, technical notes, administrative publications, journal articles, and book chapters that were approved for public release in FY96. Publications in each category are listed in chronological order under the following areas: Workforce Management, Personnel and Organizational Assessment, Classroom and Afloat Training, and Administrative Publications.				
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## Foreword

The Navy Personnel Research and Development Center (NPRDC) is an applied research center, contributing to the personnel readiness of the Navy and Marine Corps. The Center develops better ways to attract and select the most qualified people for naval service, to assign them where they are most needed, to train each one effectively and efficiently, and to manage personnel resources optimally. By combining a deep understanding of operational requirements with first-rate scientific and technical abilities, the Center is unique in being able to develop new, useful knowledge while refining technology to address people-related issues. This dual expertise permits the Center to develop a technology base for improving the use of human resources within Navy systems and to apply state-of-the-art technology to solve emerging problems.

The research and development (R&D) methods used by NPRDC are derived from behavioral, cognitive, economic, and social sciences as well as from applied mathematics, statistics, and computer science. The application of these methods results in tangible products of use to the Navy and Marine Corps. NPRDC constantly searches for technological opportunities to improve personnel readiness and to reduce manpower costs. The Center is accountable to the Chief of Naval Personnel, its sponsors, and its customers for high productivity, strict ethics, honesty, integrity, professionalism, and perspective.

NPRDC seeks to do as much of its work as possible in the operational settings where final products are intended to be used. This approach ensures that the needs of customers are met and that the customers themselves become familiar with the operational capabilities of the particular products.

This bibliography contains an abstract of each technical report, technical note, and administrative publication published and approved for public release in FY96.

A list of journal articles is also provided. Published reports are listed by appropriate subject categories for reference convenience. The scope of each category is defined below.

**Workforce Management** develops new computer-based systems and methods for allocating manpower resources, developing

personnel inventories, and distributing or assigning those personnel to improve military readiness and control costs.

**Personnel and Organizational Assessment** develops and evaluates systems for recruiting, selecting, classifying, and utilizing military personnel to improve performance. Serves as the lead Department of Defense R&D laboratory for the development of a Computerized Adaptive Testing version of the Armed Services Vocational Aptitude Battery (CAT-ASVAB).

**Classroom and Afloat Training** develops new educational and training technologies to reduce formal Navy training costs and to improve Navy training effectiveness.

**Center Support** includes formal reports on significant matters relating to the technical program, management, or administration of the Center and informational, orientation, and recruiting brochures.

Qualified users may request copies of publications from the Defense Technical Information Center (DTIC), 8725 John J. Kingman Road, Suite 0944, Ft. Belvoir, VA 22060-6218 (Telephone: Commercial [703] 767-8019 or Defense Switched Network 427-8032). General public may order from the National Technical Information Service (NTIS), Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161 (Telephone: Commercial [703] 487-4650). When placing report orders, it is helpful to provide NTIS with the AD number.

P. M. SPISHOCK  
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**Bibliography of Reports  
and Journal Articles  
Approved for Public Release:  
FY96**

<b>Workforce Management</b>
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**Technical Report**

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**NPRDC-TR-96-5  
(AD-A304 401)  
January 1996**

**Jules I. Borack  
Stephen L. Mehay**

***A Conceptual Model for Determining an Optimal Drug  
Testing Program***

A conceptual model for determining an optimal drug testing policy was developed which compared drug use in the Navy with a demographically equivalent group of civilians. A new measure of drug use, a drug-day, was defined as a day on which the user could test positive if subjected to drug testing. Algorithms were presented which estimate the deterrence and detection effects of alternative drug testing rates. The cost per drug-day was determined based on the estimated relationship between substance abuse and employee productivity in the civilian sector. Estimated benefits were compared to the cost of drug testing in order to assess the net benefit of drug testing and determine optimal test rates. Preliminary estimates derived from the conceptual model indicated that present levels of Navy drug testing were cost beneficial. Annual net benefits were estimated to exceed \$23 million.

**NPRDC-TR-96-8  
(AD-A312 124)  
July 1996**

**Jules I. Borack**

***Costs and Benefits of Alternative Drug Testing Programs***

A computerized model for determining costs and benefits of alternative drug testing programs was developed, which compared drug use in the Navy with a demographically equivalent group of civilians. The benefits of deterring and detecting drug users were compared with the costs of drug testing to determine net benefits. Benefits of testing were based on the estimated decrease in the number of drug users and the corresponding increase in employee

## Workforce Management

### Technical Reports

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productivity or value. The costs of testing included laboratory testing costs, employee time required to participate in testing, and were computed with and without the costs of replacing detected personnel. The testing rate, which maximizes the net benefits of testing, was greatly affected by the prevalence of drug use in the civilian sector and the decrease in productivity resulting from drug use. Laboratory testing costs also significantly affected the magnitude of optimal test rates. The rate of drug testing strongly influenced the benefits as well as the costs of testing and the effectiveness of the testing program. Estimates derived from the model indicated that present levels of Navy drug testing were cost beneficial. Annual net benefits were estimated at approximately \$200 million exclusive of personnel replacement costs.

## Workforce Management

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**NPRDC-TN-96-4**  
**(AD-A302 852)**  
**December 1995**

**Jules I. Borack**

#### *A Technique for Estimating the Conditional Probability of Detecting a Non-Gaming Drug User.*

In order to estimate the effectiveness of random unanalysis drug testing strategies, it is necessary to estimate the conditional probability of detecting drug users; that is, the probability that the user will test positive if selected for drug testing. This report presents a series of methodologies for estimating the conditional probability of detecting non-gaming drug users under a wide variety of drug usage and wear-off scenarios. The most general scenario assumes that the probability of detection depends upon the pattern of drug use prior to testing. For non-gaming users, it was observed that the probability of detection and the expected number of months until detection are proportional to the command monthly test rate.

**NPRDC-TN-96-5**  
**(AD-A302 853)**  
**December 1995**

**Jules I. Borack**

#### *A Procedure for Estimating the Probability of Detecting a Gaming Drug User*

In order to estimate the effectiveness of random unanalysis drug testing strategies, it is necessary to estimate the probability of detecting drug users. This report presents a series of methodologies for estimating the probability of detecting gaming drug users; individuals who choose their specific days of drug usage based upon their perceived likelihood that testing will occur on a given day. It was observed that command test strategy can dramatically impact the probability of detection. Gaming drug users were less likely to be detected under all scenarios than their non-gaming counterparts.

**NPRDC-TN-96-25**  
**(AD-A305 388)**  
**March 1996**

**Michael K. Nakada**  
**James P. Boyle**

#### *Nuclear Officer Retention: An Economic Model*

From FY91 through FY94, the average retention rate at the end of the minimum service requirement (MSR) for nuclear-trained officers dropped to 60 percent from 70 percent, the average MSR retention rate from FY87 through FY90. To combat low retention in this community, the Nuclear Officer Incentive Pay (NOIP) program was designed, but its legislative authorization expires in FY96.



## Workforce Management

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This report documents the results of an investigation of historical nuclear officer retention behavior at the end of their minimum service requirement. It specifies a 3-choice model and quantifies the impact of the NOIP retention bonus program on MSR retention.

Separate models of retention at MSR were estimated for the submarine and surface nuclear officer communities. For both communities, the retention elasticities with respect to the NOIP retention bonus program were small, but significant indicating the “pay does matter.”

These models can be used to assess the retention and cost impacts of alternative NOIP retention strategies.

## Personnel and Organizational Assessment

### Technical Notes

NPRDC-TN-96-1  
(AD-A302 904)  
November 1995

Patricia J. Thomas  
Carol E. Newell  
Dawn M. Eliassen

#### *Sexual Harassment of Navy Personnel: Results of a 1993 Survey*

The Navy Equal Opportunity/Sexual Harassment (NEOSH) Survey was developed in 1989 to monitor perceptions of disparate treatment and sexual harassment. The 1993 NEOSH Survey was mailed to a stratified sample of 9,537 officer and enlisted personnel. Post-stratification weighting of responses by gender, paygrade, and racial/ethnic group was performed prior to data analysis. Comparisons were made between subgroups in the 1993 sample and across years. Frequency data were interpreted with the chi-square test for significance ( $p < .01$ ).

Rates of sexual harassment were significantly lower in 1993 than in 1991 for officer and enlisted women, and for enlisted men. All re-measured harassing behaviors displayed a downward trend except for actual or attempted sexual assault/rape. Sexual harassment perpetrated by supervisors showed a significant decline, but harassment of women officers by civilians increased. Although very few victims of sexual harassment filed a grievance, the percentage who confronted their harasser rose.

Opinions of women and men concerning the commitment of the Navy and their local commands to combat sexual harassment were significantly more positive than in 1991. However, victims of sexual harassment expressed a significantly lower reenlistment intent than non-victims.

It was recommended that: (1) training emphasize the responsibility of seniors in preventing the harassment of juniors; (2) civilian contractors be required to comply with Navy's sexual harassment policy; and (3) the Sexual Assault Victims Intervention Program and new sexual assault reporting and tracking system be monitored to determine whether they are achieving their goals.

## Personnel and Organizational Assessment

### Technical Notes

**NPRDC-TN-96-2**  
**(AD-A304 092)**  
**November 1995**

**Gerry L. Wilcove**

#### *Navy-wide Personnel Survey (NPS) 1994: Management Report of Findings*

The 1994 Navy-wide Personnel Survey was completed by 4,589 enlisted personnel and 2,921 officers on topics related to detailing and the assignment process, quality of life, organizational climate, and health issues. Each of the topics was measured by several questions that were formed into opinion gauges ("scales") based on reliability analyses. Results for these gauges are presented separately for enlisted personnel and officers. Gauges are broken down by demographics and correlated with measures of retention plans.

**NPRDC-TN-96-3**  
**(AD-A304 093)**  
**November 1995**

**Gerry L. Wilcove**

#### *Navy-wide Personnel Survey (NPS) 1993: Management Report of Findings*

The 1993 Navy-wide Personnel Survey was completed by 4,731 enlisted and 2,841 officer personnel on topics related to detailing and the assignment process, quality of life, organizational climate, and health issues. Each of the topics was measured by several questions that were formed into opinion gauges ("scales") based on reliability analyses. Results for these gauges are presented for enlisted and officer personnel. Additional results are broken down by demographic variables.

**NPRDC-TN-96-6**  
**(AD-A307 708)**  
**December 1995**

**John H. Wolfe**  
**David L. Alderton**  
**Gerald E. Larson**  
**Janet D. Held**

#### *Incremental Validity of Enhanced Computer Administered Testing (ECAT)*

The Enhanced Computer Administered Testing (ECAT) project was a joint-service effort to estimate the potential increase in validity that could be obtained by adding new computerized tests to the current Armed Services Vocational Aptitude Battery (ASVAB). Over 10,000 recruits were tested with nine experimental computerized tests of working memory, spatial ability, and psychomotor ability. Data on the examinees' subsequent technical school performance for three Army, two Air force, and 13 Navy schools were collected, measuring laboratory, shop, training simulator and other tests of hands-on performance as well as school grades.

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The corrected multiple correlation of all ten ASVAB tests with each criterion was compared with the multiple correlation from the ECAT added to the predictor set. Results showed very large increases in validity (exceeding .10) for prediction of Air Force and Navy Air Traffic Control performance using Working Memory and Spatial tests, and even larger increases for the Army's 11H Heavy Antiarmor Weapons Crewman time-on-target averages, using psychomotor and spatial tests. Other schools, where ASVAB's validity was already high, did not show higher validity when ECAT tests were added. Averaged over all schools, validity for predicting schools' grades increased two percent, and validity for predicting performance increased nearly six percent.

**NPRDC-TN-96-7  
(AD-A302 861)  
December 1995**

**Paul Rosenfeld  
Amy L. Culbertson  
Carol E. Newell**

#### *Assessment of Equal Opportunity Climate: Results of the 1991 Navy-Wide Survey*

The Navy Equal Opportunity/Sexual Harassment (NEOSH) Survey was administered for the first time in 1989. In 1991, the NEOSH Survey was administered for the second time. The results of this second Navy-wide administration are described in this report.

The 1991 NEOSH Survey was administered to a random sample of active duty Navy enlisted personnel and officers stratified on racial/ethnic group and gender.

Among the major results were:

1. All groups had generally positive perceptions of the Navy's equal opportunity (EO) climate. Males, however, were more positive than females; Whites and Hispanics were more positive than Blacks.

2. Black (especially Black male) responses were consistently more positive in 1991 than in 1989.

3. Black females had the least positive perceptions of Navy EO climate. While there was some improvement in their perceptions over 1989, it was less than Black males showed.

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4. Hispanics and Whites responded similarly, more so than in 1989.

5. Discipline items produced the greatest racial/ethnic disparities on the NEOSH Survey, as in 1989. Perceptions of fairness in discipline were clearly lower among Blacks.

6. Men had more positive EO perceptions than women. The "gender gap" in EO perceptions between men and women officers is greater than between men and women enlisted.

7. The magnitude of race/ethnic and gender differences was less in 1991 than in 1989.

**NPRDC-TN-96-8  
(AD-A302 548)  
December 1995**

**Janet D. Held**

#### *Validation of the Armed Services Vocational Aptitude Battery (ASVAB) and the English Diagnostic Test (EDT) for the Basic Journalist (JO) Class "A" School*

The study purpose was to validate the Armed Services Vocational Aptitude Battery (ASVAB) and the English Diagnostic Test (EDT) as selection standards for the Basic Journalist (JO) Class "A" school. The study responded to a proposal to implement the EDT at the Military Entrance Processing Stations as a JO selection standard rather than at the JO school as a remediation tool. The ASVAB consists of the following 10 tests: General Science (GS), Arithmetic Reasoning (AR), Word Knowledge (WK), Paragraph Comprehension (PC), Numerical Operations (NO), Coding Speed (CS), Auto and Shop Information (AS), Mathematics Knowledge (MK), Mechanical Comprehension (MC), and Electronics Information (EI). Verbal is comprised of WK and PC. The EDT assesses grammar, comprehension, word knowledge, and sentence structure.

The EDT had higher validity than the most valid ASVAB selector composite, VE + AR (currently operational). Recommendations are to (1) raise the VE + AR minimum qualifying score of 110 to 115, (2) implement the EDT (score of 70) as a selection standard prior to JO assignment (with workbooks or other review materials issued for self-paced study prior to test time), and (3) issue a 5-point waiver

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for both the ASVAB and the EDT until sufficient data are available to determine the costs versus savings resulting from these recommendations.

**NPRDC-TN-96-9**  
**(AD-A304 098)**  
**December 1995**

**Herbert G. Baker**  
**David W. Robertson**  
**Leif Christiansen**

#### *Quality of Life for Marines at Camp Pendleton*

A comprehensive assessment of Quality of Life (QOL) in the Marine Corps, using a life domain framework, in which were included the domains of residence, neighborhood, leisure and recreation, health, friends and friendships, marriage/intimate relationship, relations with children, relations with other relatives, income/standard of living, job, and self, was conducted in 1993. This report focuses on data for Camp Pendleton only. Global quality of life was shown to have significant effects on organizational outcomes. Junior enlisted personnel were more negative on all measures of global QOL. Detailed discussions of each life domain are included.

**NPRDC-TN-96-12**  
**(AD-A304 282)**  
**January 1996**

**Elyse W. Kerce**

#### *Quality of Life in the U.S. Marine Corps: Executive Summary*

A comprehensive assessment of Quality of Life (QOL) in the Marine Corps was conducted using perceptual data collected with a questionnaire designed for this effort and objective data from extant HQMC data files. The assessment utilized a life domain framework, in which were included the domains of residence, neighborhood, leisure and recreation, health, friends and friendships, marriage/intimate relationship, relations with children, relations with other relatives, income/standard of living, job, and self. Structural equation modeling techniques were used to specify the relationships among life domains, global QOL, and organizational outcomes such as performance, retention, and personal readiness. Major findings and conclusions are summarized, and recommendations for improving QOL in the Marine Corps are presented.

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**NPRDC-TN-96-13**  
**(AD-A304 084)**  
**January 1996**

***Reflections on Paradise, Volume I: An Analysis of  
Comments of Military Families Residing Off Base,  
Hawaii 1993***

**Susan N. L. Hollingsworth**

The *Survey of Military Families Residing Off Base, Hawaii 1993* is a survey designed to gain feedback from military personnel regarding the services provided by the housing office, and their experiences in connection with obtaining housing on the local economy in Hawaii. At the end of the survey, respondents were given the opportunity to make comments about civilian housing, the performance of the housing office, or suggestions for improvement. This report analyzes those open-ended comments.

**NPRDC-TN-96-14**  
**(AD-A304 090)**  
**January 1996**

***Reflections on Paradise, Volume II: An Analysis of  
Comments of Military Families Residing On Base,  
Hawaii 1993***

**Susan N. L. Hollingsworth**

The *Survey of Military Families Residing On Base, Hawaii 1993* is a survey designed to gain feedback from military personnel regarding the services provided by the Housing Office, and their experiences in obtaining and living in on-base housing in Hawaii. At the end of the survey respondents were given the opportunity to make comments about on-base housing, the performance of the housing office, or suggestions for improvement. This report analyzes those open-ended comments.

**NPRDC-TN-96-16**  
**(AD-A304 972)**  
**February 1996**

***The Navy Values Community: Results of the 1993 Navy  
Core Values Survey***

**Herbert G. Baker**  
**Sharon K. Le**

This report contains a management summary of the results of the 1993 Navy Core Values (NCV) Survey. Sample characteristics are presented. Discussion focuses on response patterns which provide evidence of strong consensus and congruence of individual opinions and attitudes with the Navy Core Values, and on responses which show a divergence between those two domains. Also shown are selected sub-group comparisons. The results of the survey indicate the degree to which there exists a coherent

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Navy values community, and also indicate targets for future efforts in values inculcation and reinforcement.

**NPRDC-TN-96-17**  
**(AD-A304 764)**  
**February 1996**

**Herbert G. Baker**  
**David W. Robertson**  
**Leif Christiansen**

#### *Quality of Life for Marines at Camp Lejeune*

A comprehensive assessment of Quality of Life (QOL) in the Marine Corps, using a life domain framework, in which were included the domains of residence, neighborhood, leisure and recreation, health, friends and friendships, marriage/intimate relationship, relations with children, relations with other relatives, income/standard of living, job, and self, was conducted in 1993. This report focuses on data for Camp Lejeune only. Global quality of life was shown to have significant effects on organizational outcomes. Junior enlisted personnel were more negative on all measures of global QOL. Detailed discussions of each life domain are included.

**NPRDC-TN-96-19**  
**(AD-A305 693)**  
**February 1996**

**John Kantor**  
**Michael Ford**  
**Gerry Wilcove**

#### *Navy-Wide Personnel Survey (NPS) 1990-1994: Summary of Trends*

The five previous Navy-wide Personnel Survey (NPS) questionnaires were screened for questions that appeared on two or more of the surveys. The data for those questions were retrieved from the corresponding data bases and depicted on graphs. The sampling represented 4-5 percent of the eligible enlisted and 11-13 percent of the eligible officer populations throughout the years. The overall return rates were between 44 percent and 47 percent of the entire sample, varying by paygrade. Positive and negative trends were obtained, while in some cases results remained the same from year to year. Although most of the trends in this report are statistically significant, the practical significance of those trends needs to be determined by program managers. Generally, officers hold more positive views than enlisted. The upward trends generally relate to the service member and family services area in which both officers and enlisted personnel showed improved satisfaction. The negative trends in the perception of naval personnel are in the areas of equal opportunities and sexual harassment.



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**NPRDC-TN-96-21**  
**(AD-A305 743)**  
**February 1996**

**Norman G. Peterson**  
**Mary Ann Hanson**  
**John H. Wolfe**

#### *The Estimation of Incremental Validity in an Employment Setting: A Review of Relevant Literature and Some Research Design Considerations*

Improved validity coefficients have been reported for retest ASVAB scores. Two hypotheses have been made to explain this effect: Temporal Contiguity (TC), which posits a change in true scores over time, and Better Ability Estimate (BAE), which posits a reduction in error of measurement, but no true score change. This report critically reviews literature relevant to the evaluation of these two hypotheses and proposes a research design to investigate the hypotheses. The evaluation of the viability of either hypothesis is viewed as partly dependent on the type and number of criteria chosen to be predicted, and the timing of data collection on the criteria. The probability of true score changes occurring is viewed as varying within and across predictor domains (cognitive, perceptual/psychomotor, biodata, personality, vocational interests). The probability of BAE explaining validity increases is viewed as partly dependent on the nature of interventions to reduce error of measurement. A research design to investigate the two hypotheses directly is described and power analyses are provided for the design. Finally, it is suggested that more than one study will be necessary to provide firm conclusions about the TC versus BAE hypothesis, and it might be more prudent to design incremental validity research to avoid confounding with these issues.

**NPRDC-TN-96-22**  
**(AD-A305 906)**  
**March 1996**

**Herbert G. Baker**  
**Jill Ralston**

#### *The 1994 Navy Core Values Survey: Progress Toward a Navy Values Community*

This report contains the results of the second of three administrations of the Navy Core Values Survey, in addition to the results of the 1994 Survey itself. These results are compared with the previous year's (1993) results. Trends in response patterns are identified.

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**NPRDC-TN-96-23**  
**(AD-A306 217)**  
**March 1996**

**Herbert G. Baker**  
**David W. Robertson**  
**Leif Christiansen**

#### *Quality of Life for Marines at COMCABWEST*

A comprehensive assessment of Quality of Life (QOL) in the Marine Corps, using a life domain framework, in which were included the domains of residence, neighborhood, leisure and recreation, health, friends and friendships, marriage/intimate relationship, relations with children, relations with other relatives, income/standard of living, job, and self, was conducted in 1993. This report focuses on data for COMCABWEST only. Global quality of life was shown to have significant effects on organizational outcomes. Junior enlisted personnel were more negative on all measures of global QOL. Detailed discussions of each life domain are included.

**NPRDC-TN-96-24**  
**(AD-A310 450)**  
**March 1996**

**Herbert G. Baker**  
**David W. Robertson**  
**Leif Christiansen**

#### *Quality of Life for Marines on Okinawa*

A comprehensive assessment of Quality of Life (QOL) in the Marine Corps, using a life domain framework, in which were included the domains of residence, neighborhood, leisure and recreation, health, friends and friendships, marriage/intimate relationship, relations with children, relations with other relatives, income/standard of living, job, and self, was conducted in 1993. This report focuses on data for Okinawa only. Global quality of life was shown to have significant effects on organizational outcomes. Junior enlisted personnel were more negative on all measures of global QOL. Detailed discussions of each life domain are included.

**NPRDC-TN-96-27**  
**(AD-A306 915)**  
**March 1996**

**B. Charles Tatum**  
**Delbert M. Nebeker**  
**Paul H. De Young**

#### *Using Performance Indexing to Measure Organizational Gains in White Collar Environments*

Performance indexing is a useful tool for developing a measurement system of organizational effectiveness. It is particularly useful in white collar organizations because it identifies and measures the outputs that are critical to organizational effectiveness. Performance indexing can be used as a basis for making a Productivity Gain Sharing (PGS) payout. This is demonstrated by (1) showing the steps that are required to build a performance index table and (2)

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**NPRDC-TN-96-28**  
**(AD-A306 845)**  
**March 1996**

**B. Charles Tatum**  
**Delbert M. Nebeker**  
**Donna G. Wolosin**

describing the formulae that can be used for making a PGS payout. In addition to measuring product and service outputs, the performance index also allows organizations to track other dimensions of performance that are important indicators of organizational effectiveness.

#### *A Typology of Organizational Effectiveness*

This report provides a detailed look at how effective performance indicators can be developed to establish a valid and reliable measurement system. The four major components (Productivity, Financial Performance, Stakeholder Relations, and Resource Development) of organizational effectiveness are broken down into subcomponents. Aspects of performance management systems are then discussed in detail for each component and subcomponent.

Measurement issues that may be useful for organizations that are contemplating the implementation of a Productivity Gain Sharing system are discussed. This discussion is particularly useful for those organizations that have a predominantly white-collar labor force.

**NPRDC-TN-96-29**  
**(AD-A306 185)**  
**March 1996**

**Delbert M. Nebeker**  
**Donna G. Wolosin**  
**B. Charles Tatum**

#### *A Model of Continuous Organizational Improvement: Integrating Gain Sharing and Total Quality*

Continuous improvement requires an understanding of organizational processes and a focus on customer needs and desires. This report provides a model for continuous organizational improvement and shows how to integrate a reward system that motivates employees to make improvements. The model presented is a cycle of continual process improvement within an open systems framework. It focuses on the customer and then works backward from that point by showing how the organization can develop a strategic plan, improve processes, and measure performance. The model divides the organization into two subprocesses; management and production. The understanding of these two processes makes it possible to improve the quality of an organization's product or service, which in turn allows for

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**NPRDC-TN-96-30**  
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**Delbert M. Nebeker**  
**B. Charles Tatum**  
**Donna G. Wolosin**

increased productivity. Productivity Gain Sharing is the incentive system used to provide the vehicle for employee involvement as well as the energy to sustain improvements by offering performance awards.

#### ***Examples of White Collar Measurement Using a Typology of Organizational Effectiveness***

Organizations interested in increasing their effectiveness need to establish valid and reliable performance measurement systems. This is especially true for those organizations that would like to implement a Productivity Gain Sharing (PGS) system, because the success of PGS rests on the quality of the measurement system.

This report describes the four major components of organizational effectiveness (Productivity, Financial Performance, Stakeholder Relations, and Resource Development) and demonstrates how effective performance indicators can be developed to establish a valid and reliable measurement system. Emphasis is placed on total organizational improvement and measures from all four components are shown to be desired for effective PGS systems.

**NPRDC-TN-96-31**  
**(AD-A306 842)**  
**March 1996**

**B. Charles Tatum**  
**Karyll N. Shaw**  
**Ray E. Main**

#### ***Integrating Measurement Approaches in Gain Sharing and Total Quality***

Productivity Gain Sharing and Total Quality Management are two highly successful approaches to increasing productivity and improving quality. This report provides a synthesis of the literature and develops an integrated definition and approach.

The first part of this report discusses the concepts of productivity and quality (how they are defined), the different perspectives (how they are measured), and shows how the two concepts are interrelated. The second part focuses on some of the causes of the productivity and quality problems in the United States and provides keys to reducing these problems.

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**NPRDC-TN-96-32**  
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**Karyll N. Shaw**  
**B. Charles Tatum**  
**Donna G. Wolosin**

#### *Evaluation of Productivity Gain Sharing in Six Navy Organizations*

This report describes the Navy's general approach to Productivity Gain Sharing (PGS) as well as the PGS systems in six organizations. Factors that are conducive to the successful implementation of PGS are described. Findings of Time 1 data collection in a planned, on-going evaluation process are presented and discussed. Approximately \$12.8 million in gains was documented for FY88 and FY89 across the six PGS sites. Factors existing in the internal and external environments of the organizations are discussed in terms of their impact on the long-term success of the gain sharing systems.

**NPRDC-TN-96-33**  
**(AD-A306 974)**  
**March 1996**

**Delbert M. Nebeker**  
**B. Charles Tatum**

#### *An Approach to Measurement of Quality and Productivity for Gain Sharing: Measuring Total Organizational Value*

When measuring organizational effectiveness, the focus should be on the value of what the organization does. The approach described in this report integrates measures of productivity, quality, and other less tangible dimensions of performance into a formula that produces an index of "total value." This index can then be used to assess improvements and make Productivity Gain Sharing payouts.

**NPRDC-TN-96-36**  
**(AD-A306 185)**  
**March 1996**

**Herbert G. Baker**  
**David W. Robertson**  
**Leif Christiansen**

#### *Quality of Life for Marines at COMCABEAST*

A comprehensive assessment of Quality of Life (QOL) in the Marine Corps, using a life domain framework, in which were included the domains of residence, neighborhood, leisure and recreation, health, friends and friendships, marriage/intimate relationship, relations with children, relations with other relatives, income/standard of living, job, and self, was conducted in 1993. This report focuses on data for COMCABEAST only. Global quality of life was shown to have significant effects on organizational outcomes. Junior enlisted personnel were more negative on all measures of global QOL. Detailed discussions of each life domain are included.

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**NPRDC-TN-96-37**  
**(AD-A306 971)**  
**March 1996**

**John J. Pass**  
**Norman M. Abrahams**  
**Darlene R. Cole**  
**Jack E. Edwards**

#### *Development of Interest Scales to Identify Female Applicants for Nontraditional Navy Ratings*

The Navy is attempting to increase the participation of women in "nontraditional" (NT) Navy ratings. One way to increase the participation rate is to develop new screening criteria. A second option involves developing career guidance tools to identify women whose vocational interests indicate they should consider entering NT ratings. The purpose of this project was twofold: update the Navy Vocational Interest Inventory (NVII) items and demonstrate that keys could be developed which could identify female applicants with interests in NT ratings. Cross-validation results indicated that NVII scales from this study effectively differentiate between the interests of women in traditional and NT ratings. In addition, the cluster-specific scales were significantly and substantially related to self-reported satisfaction with work in nontraditional ratings.

**NPRDC-TN-96-38**  
**(AD-A307 956)**  
**March 1996**

**Dale N. Glaser**

#### *The Effects of Quality of Life Factors on Turnover and Performance in the Private Sector: A Literature Review*

A literature review was conducted assessing the effects of Quality of Life (QOL) and related factors that affect turnover and performance in the private sector. Support was found for the spillover model (attitudes from one sector of life, such as work, carry over into another sphere, such as home). However, determining the causal direction of the work-nonwork relationship is still speculative. Some evidence has been found for the effects of family responsibilities on work (e.g., tardiness). Possible variables that influence turnover include pay/salary, health, and shiftwork. The QOL/performance relationship is suggestive at best given the lack of research.

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### Technical Notes

NPRDC-TN-96-40  
(AD-A307 111)  
April 1996

Marjorie H. Royle  
Patricia J. Thomas

#### *Reducing Unplanned Pregnancies in the Navy*

The objective of this study was to identify promising approaches to reduce unplanned pregnancies in the Navy. A message was sent to Navy commands with women to collect information on efforts to address this problem. Using 1988 and 1992 surveys, responses of first-term enlisted women with planned and unplanned pregnancies were compared to responses of nonpregnant women to identify demographic differences. Finally, civilian studies of efforts to prevent pregnancy among adolescents were examined.

The findings indicated that while only about a third of all commands that responded to the message have pregnancy programs, 60% of the women in the sample are at such commands. Most programs provide little more than information about rights and responsibilities, the costs of pregnancy, and contraceptive methods. The surveys revealed that E-2 to E-4 women who planned their pregnancies were older, in a higher paygrade, and more likely to be married and carry their pregnancies to term than those who had not. The most effective civilian programs for reducing pregnancy incorporate many factors in addition to providing contraceptive information. These factors included developing motivation to use contraception and improving access to contraceptives. Also important are providing instruction, practice, and skill-building in decision making, assertiveness, communications, and other social skills necessary to negotiate abstinence or contraceptive use, and changing the peer group climate to support and reinforce such behaviors.

It was recommended that (1) all routine Navy physicals for first-term men and women include a discussion of risks of pregnancy, sexual transmitted diseases, and contraceptives; (2) the sexuality curriculum in recruit training be expanded to include assertiveness and communication, decision making, and resistance to negative peer pressure; (3) training materials be developed to help sailors assess their personal behaviors and risks, teach the specific interpersonal skills needed to negotiate abstinence

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or use of contraception, and provide information on physiology and contraception and the costs of parenthood; and (4) training be developed for chief petty officers so that they are comfortable discussing contraception, resisting negative peer pressure, and making life choices with young sailors.

**NPRDC-TN-96-41**  
**(AD-A)**  
**April 1996**

**Gerry L. Wilcove**

#### *1994 Navy Quality of Life Survey*

During a period of downsizing and fiscal cutbacks, quality of life (QOL) and retention may suffer. To assess QOL in the Navy, 17,000 surveys were mailed to enlisted personnel and officers. A total of 7,100 were completed and returned, a response rate of 47 percent. The survey addressed overall QOL, and 13 "life domains" such as work, professional development, pay, benefits, relationship with children, and leisure and recreational activities. The survey also addressed comparison of military life with civilian life and organizational outcomes, including intention to remain and perceived level of performance, readiness, and deployability. Where possible, scales were formed, and results reported for them. Sixty-three percent of officers, but only 45 percent of enlisted personnel, were satisfied with overall QOL in the Navy. Comprehensive results and conclusions are presented for all the other areas addressed by the survey.

**NPRDC-TN-96-42**  
**(AD-A308 609)**  
**April 1996**

**John Kantor**  
**Michael Ford**  
**Jennifer E. Heron**

#### *Navy-wide Personnel Survey (NPS): Statistical Tables for Officers*

The annual Navy-wide Personnel Survey (BPS) was designed to collect opinion data on a systematic basis and to provide timely information on issues of importance to policy makers. The annual sampling, representative of the entire Navy population, allows the identification and analysis of trends in opinions and attitudes toward plans, programs, and policies that materially affect the performance and morale of Navy personnel. The survey was also designed to accommodate the study of topics of compelling interest on a one-time basis. This technical note provides enlisted results of NPS 1995, the sixth administration of NPS. NPS



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questionnaires were mailed in November 1995 to a random sample of 17,000 enlisted personnel and officers with a projected rotation date of December 1995 or later. Personnel who received the 1994 survey were not eligible for inclusion in the sample. The sampling represented approximately 5 percent of the eligible enlisted population and 12 percent of the eligible officer population. The adjusted return rate was 46 percent. The survey requested demographic information and measured military personnel attitudes and opinions in various areas, including detailing and the assignment process, quality of life programs, leadership training, organizational climate, and health issues.

**NPRDC-TN-96-43**  
**(AD-A308 846)**  
**April 1996**

**John Kantor**  
**Michael Ford**  
**Jennifer E. Heron**

#### ***Navy-wide Personnel Survey (NPS): Statistical Tables for Enlisted Personnel***

The annual Navy-wide Personnel Survey (BPS) was designed to collect opinion data on a systematic basis and to provide timely information on issues of importance to policy makers. The annual sampling, representative of the entire Navy population, allows the identification and analysis of trends in opinions and attitudes toward plans, programs, and policies that materially affect the performance and morale of Navy personnel. The survey was also designed to accommodate the study of topics of compelling interest on a one-time basis. This technical note provides enlisted results of NPS 1995, the sixth administration of NPS. NPS questionnaires were mailed in November 1995 to a random sample of 17,000 enlisted personnel and officers with a projected rotation date of December 1995 or later. Personnel who received the 1994 survey were not eligible for inclusion in the sample. The sampling represented approximately 5 percent of the eligible enlisted population and 12 percent of the eligible officer population. The adjusted return rate was 46 percent. The survey requested demographic information and measured military personnel attitudes and opinions in various areas, including detailing and the assignment process, quality of life programs, leadership training, organizational climate, and health issues.

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**NPRDC-TN-96-44**  
**(AD-A311 382)**  
**June 1996**

**Patricia J. Thomas**  
**Sharon K. Le**

#### *Sexual Harassment in the Marine Corps: Results of a 1994 Survey*

The purpose of this study was to analyze the sexual harassment items in the Marine Corps Equal Opportunity Survey (MCEOS). This survey was developed and administered to monitor sexual harassment among Marine Corps personnel, along with associated issues. The MCEOS was patterned after the Navy Equal Opportunity/Sexual Harassment (NEOSH) Survey. It was mailed in May 1994 to over 10,000 active duty Marines. Responses were weighted by gender, paygrade, and racial/ethnic group before computing percentages for relevant subgroups.

The results are very similar to those obtained with the 1993 NEOSH Survey. Women were sexually harassed more often than men, enlisted more often than officers, Caucasian women more often than Black women, and personnel in the lower paygrades/ranks more often than their seniors. Generalized sexual harassment was more common than harassment targeted at individuals. Perpetrators were most likely to be fellow Marines. Victims of sexual harassment rarely filed a complaint whereas those that did were usually not satisfied with the manner in which it was handled. It was recommended that: (1) the Marine Corps continue to monitor sexual harassment through the administration of the MCEOS biennially; (2) the results of the 1994 MCEOS be used in training; and (3) the source of dissatisfaction with the complaint system be determined.

**NPRDC-TN-96-46**  
**(AD-A313 239)**  
**July 1996**

**Susan N. L. Hollingsworth**

#### *This Is Our Life! (A Summary of the Written Comments from the 1993 Navy-wide Personnel Survey)*

The Navy-wide Personnel Survey (NPS) was commissioned by the Chief of Naval Personnel in 1990 to collect data on the opinions and perceptions that enlisted and officer personnel had of life in the Navy. A modified NPS is administered annually to provide feedback on key issues such as: detailing and the assignment process; quality of life programs; leadership training; the organizational climate; health issues; and other general comments on topics of

## Personnel and Organizational Assessment

### Technical Notes

**NPRDC-TN-96-48**  
**(AD-A313 503)**  
**August 1996**

**John Kantor**  
**Michael Ford**  
**Jennifer Heron**

current interest. The 1993 survey is the fourth version of the NPS. Space was provided for personnel to make comments or express opinions about each area covered by the survey in addition to answering multiple choice items. This report contains a summary of the comments made by personnel.

#### *Navy-wide Personnel Survey (NPS) 1990-1995: Summary of Trends*

The responses on six Navy-wide personnel surveys have been compared and charted in this report. Items with consistent wording were analyzed, and the results are depicted in graphs. Only those items that remained the same during those years were included in the comparisons. When interpreting results, only items that show two consecutive downturns or upturns should be considered trends. The statistical significance of each directional shift on the graph is purposefully omitted in favor of letting the reader decide the practical significance of each trend. The reason for this decision is that the large number of cases in the surveys causes even small differences in trends to be statistically significant, although many of those differences may not be practically meaningful. In interpreting the trends, a conservative estimate of error (+3% to -3%) should be applied. A 3 percent fluctuation around the actual percentage should be considered as no change. For example, if a 50 percent agreement with a statement changed from 1 year to another, such change should not be considered a change unless it fell below 47 percent or above 53 percent. Between 47 percent and 53 percent is considered the same as 50 percent. The results of the trend analysis are depicted in the graphs.

**NPRDC-TN-96-49**  
**(AD-A314 137)**  
**August 1996**

**Susan N. L. Hollingsworth**

#### *This Is Our Life! (A Summary of the Written Comments from the 1992 Navy-wide Personnel Survey)*

The Navy-wide Personnel Survey (NPS) was commissioned by the Chief of Naval Personnel in 1990 to collect data on the opinions and perceptions that enlisted and officer personnel had of life in the Navy. A modified NPS is administered annually to provide feedback on key issues

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such as: detailing and the assignment process; quality of life programs; leadership training; the organizational climate; health issues; and other general comments on topics of current interest. The 1992 survey is the fourth version of the NPS. Space was provided for personnel to make comments or express opinions about each area covered by the survey in addition to answering multiple choice items. This report contains a summary of the comments made by personnel.

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**NPRDC-TR-96-1**  
**(AD-A300 093)**  
**October 1995**

**Betty V. Whitehill**  
**John A. Ellis**

#### *The Effect of Qualitative Explanations and Pictures on Learning, Retention, and Transfer of Procedural Tasks*

Two experiments investigated the effects of qualitative explanations and pictures on learning, retention, and transfer of a procedural assembly task. Results showed (1) functional explanations are more effective than structural explanations in learning and remembering a procedural task, however, their effects are diminished when learning subsequent similar tasks, (2) providing pictures facilitates learning but does not help performance once the task has been learned to criterion, and (3) previous experience in a task domain results in positive transfer to new tasks in the same domain.

**NPRDC-TR-96-2**  
**(AD-A300 925)**  
**October 1995**

**C. Douglas Wetzel**

#### *Evaluation of a Celestial Navigation Refresher Course Delivered by Videoteletraining*

The use of videoteletraining (VTT) to deliver a Celestial Navigation course was evaluated. Three treatment groups were compared with a total of 279 students: (1) traditional classrooms; (2) VTT local classrooms with an instructor and students, and (3) VTT remote classrooms where students were connected to the local classroom by a two-way audio and video VTT system. Student performance on homework during the week was similar among groups, VTT remote students were slightly lower than local students on a final examination, but similar numbers of students passed the course. An interaction tally of instructor and student questions showed slightly fewer interactions per hour for VTT remote sites than for the local site where there were more students. However, there was no disadvantage for VTT remote students when examined on a per student per hour basis. Responses on a student questionnaire were generally positive and remote site students responded only slightly less favorably than local site students. Remote students were more favorable toward the use of a picture-in-picture display showing both an instructor and visuals during lengthy periods when the instructor would normally have been off screen. The evaluation showed that delivery of the course by

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**NPRDC-TR-96-3**  
**(AD-A302 908)**  
**November 1995**

**Sandra K. Wetzel-Smith**  
**John A. Ellis**  
**Angelique M. Reynolds**  
**Wallace H. Wulfeck II**

videoteletraining has been successful and can be expanded to other sites in order to reduce travel costs.

#### ***The Interactive Multisensor Analysis Training (IMAT) System: An Evaluation in Operator and Tactician Training***

The Interactive Multisensor Analysis Training (IMAT) system was developed to address post Cold War ASW training requirements. It is designed to teach the complex conceptual knowledge and cognitive and procedural skills required to reason about the interrelationships among the operating modes of target submarines, the environmental variables that affect sound transmission, and the sensor systems used for detection and tracking. This effort evaluated the application of the IMAT system in the Sonar Technician Surface (STG) "A" school and the Fleet Aviation Specialized Operations Training Group Pacific Tactical Training Course (TTC) at Barbers Point. The results showed that (1) research on cognition and instruction and technological advances in displaying complex information can be integrated and applied in real world training to produce substantial gains in performance and student motivation, (2) the IMAT system achieved its intended design goals by effectively teaching complex knowledge and cognitive skills, (3) the IMAT system emphasis on adhering to the principles of high quality instructional design, especially practice opportunities, contributed significantly to the observed performance improvements, and (4) IMAT can accelerate the development of expertise in tactical oceanography and decision making.

**NPRDC-TR-96-4**  
**(AD-A304 318)**  
**January 1996**

**C. Douglas Wetzel**  
**Paul H. Radtke**  
**Steven W. Parchman**  
**George E. Seymour**

#### ***Delivery of a Fiber Optic Cable Repair Course by Videoteletraining***

The feasibility of using videoteletraining (VTT) to deliver a hands-on laboratory course on fiber optic cable repair was evaluated to explore the potential for extending the use of VTT beyond lecture-based courses. Three treatment groups were compared with a total of 50 students: (1) traditional classrooms, (2) VTT local classrooms with an

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instructor and students, and (3) VTT remote classrooms where students were connected to the local classroom by a two-way audio and video VTT system. There were no significant differences between groups on procedural errors during two connector repair laboratory tasks or on observer ratings of safety and the quality of student work. There were also no significant group differences on a troubleshooting performance test and a written examination. There was a slight trend for remote students to need greater assistance and for their laboratories to take longer. Few differences were found on a student questionnaire. An interaction tally of instructor and student questions showed little differences between groups. The evaluation showed that it was feasible to deliver the course by VTT, given the extra support requirements and marginal travel cost savings for small numbers of students. Findings relevant to delivering other laboratory courses by VTT are discussed and enhanced preparation of remote students prior to performing their laboratory work is suggested as one method to offset the reduced assistance available to remote students.

**NPRDC-TR-96-6**  
**(AD-A308 013)**  
**April 1996**

**C. Douglas Wetzel**  
**H. Lauren Pugh**  
**Nick Van Matre**  
**Steven W. Parchman**

### *Videoteletraining Delivery of a Quality Assurance Course with a Computer Laboratory*

A Quality Assurance (QA) course containing a student computer laboratory was delivered by videoteletraining (VTT). Two primary treatment groups were compared during four class convenings with a total of 100 students: (1) a VTT local classroom with an instructor and students, and (2) a VTT remote classroom where students were connected to the local classroom by a two-way audio and video VTT system. There were no significant group differences on a final examination and the scores were comparable with those for 133 students from traditional classrooms. Local and remote students were not significantly different on a quiz of facts on operating the computer program to produce a QA report in the laboratory. Few group differences were found on a student questionnaire. Small but significant differences were found on topics concerning the visibility of instructional aids, access to or attention from the instructor, and problems encountered during the computer laboratory.

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Remote students were less likely than local students to initiate interactions over the VTT network, but they participated equally when they were identified in instructor questions. The course was successfully delivered by VTT and could be expanded to other training sites. A cost analysis for two projected delivery sites indicated avoided student travel costs would be in excess of the combined costs for VTT classroom usage and computer equipment. VTT delivery techniques illustrated in this work include enhanced preparation of remote students prior to performing their laboratory work and the use of portable laptop computers with a wireless network that allowed the use of existing VTT classrooms.

**NPRDC-TR-96-7**

**(AD-A308 012)**

**April 1996**

**C. Douglas Wetzel**

#### ***Distributed Training Technology Project: Final Report***

The objective of the Distributed Training Technology project was to extend the use of videoteletraining (VTT) beyond lecture-based courses traditionally given by VTT to courses with interactive or hands-on laboratory environments. Lessons learned and guidelines resulting from the effort were derived for this final project report. The project formally evaluated the feasibility of using VTT to deliver training in four course content areas representing different challenges for VTT: Celestial Navigation, Navy Leadership, Fiber Optic Cable Repair, and a computer laboratory in a Quality Assurance course. A combination of three approaches has the greatest generality for implementing VTT laboratory courses: (1) students can be better prepared prior to performing laboratory work, (2) support at the remote site can be increased by providing a surrogate for the instructor in order to supervise students and conduct laboratory activities, and (3) video technology can be used to increase the visibility of activities between sites. An increased level of effort is required to convert and deliver VTT laboratory courses. Training equipment adapted for portability allows classrooms to be used by other VTT courses. Courses must be selected for student throughput sufficient to provide savings in travel costs.



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NPRDC-TR-96-9  
(AD-A313 318)  
August 1996

Sandra K. Wetzels-Smith  
Carl Czeck

#### *The Interactive Multisensor Analysis Training System: Using Scientific Visualization Technology to Teach Complex Cognitive Skills*

Successful operation of airborne weapons and sensor systems demands that operators and tacticians possess high-level understanding of how environments and potential targets interact so they may best configure onboard suites. The complex cognitive skills required can only be the product of appropriately designed training, especially when opportunities for practice are limited. The Interactive Multisensor Analysis Training (IMAT) System uses advanced scientific visualization technology to conceptually present the interactions among sensors, and environments in realistic mission scenarios. Using approved Navy, Department of Defense, and other suitable databases (e.g. DBDB-5, ANDES), IMAT computers and display systems transform the data into understandable graphic formats. As support for cognitive skill oriented training programs, IMAT has provoked a new approach to instructional design. The IMAT approach promises to increase training efficiency and effectiveness in complex warfare areas such as anti-submarine, electronic, and mine countermeasures by accelerating the development of domain expertise and improving trainee performance during training. IMAT may also be appropriately applied to other complex cognitive skill domains inside and outside the Department of Defense, including technical training and education in meteorology, oceanography, geology, ecology, and disaster preparedness.

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**NPRDC-TN-96-10**  
**(AD-A304 110)**  
**January 1996**

**Josephine M. Randel**  
**H. Lauren Pugh**  
**Barbara G. Wyman**

#### *Methods for Conducting Cognitive Task Analysis for a Decision Making Task*

Cognitive task analysis (CTA) improves traditional task analysis procedures by analyzing the thought processes of performers while they complete a task. For this report, we have selected several of the measures for which we found differences in experts and novices and have detailed the procedures for using these methods to conduct a CTA for domains which involve critical decision making tasks in naturalistic settings. The cognitive task analysis methods that we describe are: (1) development of a task process model, (2) development of an information flow model, (3) misconceptions analysis, and (4) structural knowledge analysis. For each of these methods we describe how information is gathered (knowledge elicitation), how it is represented in a format that can be later used in designing training (knowledge representation), and how the knowledge can be used in developing training.

**NPRDC-TN-96-11**  
**(AD-A)**  
**January 1996**

**Herbert G. Baker**  
**Marjorie M. Sands**

#### *Test-Retest Reliability of the Civilian-Military Interest Survey (C-MIS)*

This report documents the test-retest reliability of the Civilian-Military Interest Survey. The test was administered to 101 male and 99 female Navy recruits. Correlations ranged from .82 to .90 for men and from .76 to .90 for women. Cross-tabulations show that approximately 70% of both men and women obtained their highest scores on the same scale across both test administrations.

**NPRDC-TN-96-15**  
**(AD-A304 201)**  
**January 1996**

**David W. Robertson**

#### *Feasibility of Surveying Navy Dependents About Substance Abuse: Alternative Approaches, Cost Estimates, Sampling*

This report addresses the feasibility of administering a survey about substance abuse to Navy dependent (NDEP) spouses and youth. Because of the extreme sensitivity of the items ("Do you use the following drugs . . . ?"), known as self-report questions, special consideration was given to:

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survey mode (interview, by-mail, etc.), protection of confidentiality, nonresponse rate, and validity of response.

On-going survey projects with national samples were reviewed. Special problems regarding identification and location of a sample of NDEPs (involving more complex procedures than for a national sample) were addressed. Costs were roughly estimated for alternative modes of administration under two conditions: (1) "Piggy-back" an on-going survey project and (2) conduct a separate NDEP survey.

As a tool for management decision making, a matrix format was designed to display a summarization of many considerations for each alternative mode.

**NPRDC-TN-96-18**  
**(AD-A305 695)**  
**February 1996**

**Marjorie M. Sands**  
**Herbert G. Baker**

#### ***Comparison of C-MIS Response Patterns Across Varying Categories of Respondents***

This report documents research using the Civilian-Military Interest Survey (C-MIS). Response patterns vary according to the category of test subject, which included Navy recruits, high school students, and Navy recruiters in training. Findings are generally in accord with the Holland theory upon which the test was constructed.

**NPRDC-TN-96-20**  
**(AD-A306 324)**  
**February 1996**

**Reynaldo I. Monzon**  
**Janet D. Held**

#### ***Validation Study of Armed Services Vocational Aptitude Battery (ASVAB) Selector Composites: Basic Electricity and Electronics (BE&E) Schools and Their Class "A" Schools for the Electronics Occupational Group***

The purpose of this study was to validate ASVAB composites for the 11 ratings of the Electronics (OG) Occupational Group. The ASVAB consists of the following 10 tests: General Science (GS), Arithmetic Reasoning (AR), Word Knowledge (WK), Paragraph Comprehension (PC), Numerical Operations (NO), Coding Speed (CS), Auto and Shop Information (AS), Mathematics Knowledge (MK), Mechanical Comprehension (MC), and Electronics Information (EI). Verbal (VE) is composed of WK and PC.

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This study was requested because of high attrition rates in the follow-on class "A" schools and the merging of the BE&E prerequisite schools into the follow-on Class "A" schools. The study recommends (1) retaining the operational selector composite and minimum qualifying score,  $AR + MK + EI + GS = 218$ , and (2) conducting expectancy analyses after the BE&E and follow-on Class "A" schools are merged to determine if the 218 minimum qualifying score is adequate.

**NPRDC-TN-96-26**  
**(AD-A306 975)**  
**March 1996**

**Allan W. Wicker**

#### *Quality of Life and Military Outcomes: A Conceptual Framework and Suggestions for Planned Research*

This report presents a conceptual framework and suggestions for a planned study of quality of life (QOL) and military outcomes among Navy personnel. The conceptual framework links individual variables (e.g., age, marital status, and Navy paygrade) and contextual Navy variables (e.g., command) with two conceptions of subjective QOL: satisfaction with particular domains in one's life (e.g., marriage and job) and global life satisfaction. A number of facets of life domains are identified, including overall satisfaction, satisfaction with aspects of the domain, centrality of the domain, and perceived relevance of the Navy to domain satisfaction. QOL needs in a given domain are represented as the interaction of domain satisfaction and centrality. Additional contributors to life satisfaction are recent experiences of satisfaction and dissatisfaction within life domains, the degree to which individuals' personal characteristics fit the Navy environment, and personal dispositions such as optimism. Three types of person-level military outcomes are considered: retention, job performance, and readiness. These outcomes are related to global and domain satisfaction and to person-environment fit. One section of the report lists expectations derived from the conceptual framework; another presents specific research recommendations.

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**NPRDC-TN-96-34**  
**(AD-A306 912)**  
**March 1996**

**Linda J. Mark**  
**H. Dewey Kribs**  
**Barbara A. Morris**  
**David K. Dickason**

#### *Cost/Benefits Analysis of Interactive Electronic Technical Manuals/Automated Classroom (IETM/AC) Technology*

The Navy Personnel Research and Development Center (NPRDC), working with the Naval Sea Systems Command (NAVSEA) and Chief of Naval Education and Training (CNET), completed a program of research, development, and evaluation for automating classroom activities in which interactive electronic technical manuals (IETMs) are used. The project addressed two Navy training problems: (1) the need to utilize emerging technologies to improve maintenance performance and reduce maintenance costs and (2) the need to improve the efficiency of the Navy training pipeline. These problems are being addressed by combining IETM technology with an integrated electronic multimedia editing and delivery system.

The cost/benefits analysis determined the costs associated with the IETM/AC system and assessed the benefits of the advanced training technology implemented in the Gas Turbine C School, Service School Command, Great Lakes, IL. This report is directed to training communities and program managers who may be developing similar automated systems.

Benefits identified during this analysis include improved student performance, reduction in student training costs, and reduction in course reproduction costs.

**NPRDC-TN-96-35**  
**(AD-A307 006)**  
**March 1996**

**H. Dewey Kribs**  
**Linda J. Mark**  
**Barbara A. Morris**  
**David K. Dickason**

#### *A Survey of Interactive Electronic Technical Manuals Used for Training and Education*

The Navy Personnel Research and Development Center (NPRDC), working with the Naval Sea Systems Command (NAVSEA) and Chief of Naval Education and Training (CNET), completed a program of research, development, and evaluation for automating classroom activities in which interactive electronic technical manuals (IETMs) are used. The project addressed two Navy training problems: (1) the need to utilize emerging technologies to improve

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maintenance performance and reduce maintenance costs and (2) the need to improve the efficiency of the Navy training pipeline. These problems are being addressed by combining IETM technology with an integrated electronic multimedia editing and delivery system.

The survey and analysis was conducted of practices in the design, development, and application of education and training that incorporates interactive, hypermedia-based and IETM-like documents. An overview of IETMs is provided. Applications surveyed included such instructional settings as traditional classroom instruction, virtual classrooms, and on-demand and just-in-time instruction. The survey also covered both Navy and non-Navy applications. Non-Navy activities included other military, government, industry, and higher education organizations.

**NPRDC-TN-96-39**  
**(AD-A307 191)**  
**April 1996**

**Barbara A. Morris**  
**David K. Dickason**

#### *Evaluation of the Interactive Electronic Technical Manual/Automated Classroom (IETM/AC)*

The Navy Personnel Research and Development Center (NPRDC), working with the Naval Sea Systems Command (NAVSEA) and Chief of Naval Education and Training (CNET), completed a program of research, development, and evaluation for automating classroom activities in which interactive electronic technical manuals (IETMs) are used. The project addressed two Navy training problems: (1) the need to utilize emerging technologies to improve maintenance performance and reduce maintenance costs and (2) the need to improve the efficiency of the Navy training pipeline. These problems are being addressed by combining IETM technology with an integrated multimedia editing and delivery system.

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**NPRDC-TN-96-45**  
**(AD-A313 984)**  
**July 1996**

**Kristin Packer**  
**Eleanor Holmes**  
**Gregory M. Hale**  
**Bill Beatty**  
**Rich Loeffler**  
**Sandra K. Wetzel-Smith**

#### *IMAT Team Reference Document Active Sonar Predictions*

The Interactive Multisensor Analysis Training (IMAT) system is used to teach complex conceptual knowledge and cognitive and procedural ASW skills. This computer-based instructional approach to underwater warfare is being used to improve training in aviation, surface, and subsurface communities. This document is a reference guide for an audience of IMAT programmers, implementers, and curriculum developers. It discusses the capabilities and limitations of the Advanced Underwater Acoustic Modeling Project (AUAMP) model. The AUAMP has been implemented in the IMAT Active Sonar Prediction Module. The document is intended to be detailed enough to help the audience understand the AUAMP model. This understanding can help the audience develop lessons that teach useful concepts by using meaningful and realistic scenarios.

**NPRDC-TN-96-47**  
**(AD-A314 661)**  
**August 1996**

**Gregory W. Lewis**

#### *Personnel Performance Workload Modeling for a Reduced Manned Bridge: Lessons Learned*

Declining budgets and decreased military personnel strength have provided major reasons for reducing shipboard personnel. The specific objective of this project was to develop a "proof-of-concept" for assessing performance workload levels of operational shipboard personnel to be used in the rapid prototyping of ship designs for reducing shipboard manning levels. A review of shipboard reduced manning efforts and development of the "Entering San Diego Harbor" scenario are described. Personnel performance workload models, using this scenario, were developed and exercised for this project. The lessons learned in developing this scenario and moment-to-moment fluctuations in workload data are described for three bridge crew configurations. Three appendices describe a review of human performance models, additional literature related to personnel assessment technologies and personnel costs models, and the bridge team functions and tasks used in the nine member bridge team workload model.

## **Classroom and Afloat Training**

### **Technical Notes**

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This effort showed that personnel performance workload levels can be measured under current and reduced manning levels, either with or without automated equipment. Workload modeling would provide valuable information to assess current and reduced manning configurations, and operational exercises readiness. Workload modeling could contribute to the objective evaluation of automated equipment implementation and crew member reduction.



## Classroom and Afloat Training

### Journal Article

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Randel, J. M., Pugh, H. L., & Reed, S. K. (1996)  
Differences in expert and novice situation awareness in  
naturalistic decision making. *International Journal of  
Human-Computer Studies*, 45, 579-597.

## Center Support

### Administrative Publications

**NPRDC-AP-96-1**  
**(AD-A302 905)**  
**November 1995**

**Patricia J. Thomas**

#### *Annotated Bibliography of Publications on Women in the Navy*

The Navy Personnel Research and Development Center (NAVPERSRANDCEN) has been conducting research on Navy and Marine Corps women since 1975. The early studies tended to be comparative, responding to questions about how women's career behavior differed from or was similar to men's. As regulations and laws applying solely to women changed, new research issues arose, such as the integration of women into formerly all-male environments, the impact of women on the military mission, and sexual harassment.

This document is the first bibliography of reports, journal articles, and book chapters that have been published by researchers at NAVPERSRANDCEN on military women in the Department of the Navy. The publication dates range from May 1976 to December 1994. Approximately 50 reports and articles are abstracted and indexed by subject area so that readers can locate publications that address their interests.

**NPRDC-AP-96-2**  
**(AD-A305 665)**  
**March 1996**

#### *Bibliography of Reports and Journal Articles Approved for Public Release: FY95*

This report lists all technical reports, technical notes, administrative publications, journal articles, and book chapters that were approved for public release in FY95. Publications in each category are listed in chronological order under the following areas: Workforce Management, Personnel and Organizational Assessment, Classroom and Afloat Training, and Administrative Publications.

**NPRDC-AP-96-3**  
**(AD-A306 860)**  
**November 1995**

**Patricia J. Thomas**

#### *Annotated Bibliography of Publications on Minorities in the Navy*

This is the first bibliography of reports, journal articles, and book chapters that have been published by researchers at Navy Personnel Research and Development Center on minorities in the Department of the Navy. The publication dates range from June 1974 to December 1995. The

## Running H/F3

### Running H/F 4

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summaries have been arranged sequentially, starting with the most recently published research. Thirty-five reports, articles, and book chapters are referenced.

The bibliography is indexed by subject area so that readers can locate publications that address their interests. Each entry is followed by a summary and, whenever possible, the Defense Technical Information Center (DTIC) number. Reports may be requested from DTIC using these numbers.

**NPRDC-AP-96-4  
(AD-A308 832)  
April 1996**

#### ***Command History--Calendar Year 1995***

This report reflects the Navy Personnel Research and Development Center's 1995 operating philosophy, Commanding Officer, and Technical Director biographies, history, organization, center resources, research and development program, Commanding Officer and Technical Director awards, and publications and presentations.

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